

REMARKS

The present invention concerns a method of controlling a laser module in a wavelength division multiplexing (WDM) application, more especially controlling a laser module during initial powering up of the module (page 1, final paragraph) to add a new wavelength channel to the system. The method comprises the steps of: a) before applying a laser current to operate the laser module, establishing a predetermined laser temperature using the temperature control means and setting the attenuation of the attenuator to a maximum attenuation; b) applying a laser current having a value which produces a nominal desired wavelength and controlling the laser current to give a wavelength of operation substantially equal to the desired wavelength; and c) reducing the attenuation of the attenuator to a level to give a predetermined output power from the laser module. It should be noted that new claim 51 explicitly requires *the steps of the method to be executed in the recited order*.

The method of the invention enables additional wavelength channels, with a precisely controlled wavelength and power, to be added to a WDM telecommunications system. In dense WDM systems, the channel spacing is of the order of 100 GHz or less and it is essential that when the laser module is powered up, it outputs radiation at precisely the desired wavelength to prevent corruption of existing wavelength channels on the system. The method of the invention eliminates the need for an optical switch on the output of the module. Such optical switches have a number of drawbacks compared to variable optical

attenuator: i) a high insertion loss (typically 0.8dB), ii) prohibitively expensive, and iii) reliability, since optical switches are typically based on electro-mechanical devices.

Although a variable optical attenuator is incapable of achieving total isolation in its "off-state" (as can be achieved by an optical switch), as would be necessary when using the known methods of controlling the laser to prevent radiation being emitted from the module and into the system during wavelength stabilization of the module, the method of the present invention enables the use of a variable optical attenuator. This is achieved by stabilizing the laser temperature before applying any laser current, and then only applying the laser current with the attenuator set to maximum attenuation. Furthermore, since the current is initially applied having a value which is known to produce a nominal desired wavelength, any radiation that might be emitted during wavelength stabilization will not interfere with any existing wavelength channels.

Claims 32, 35-42 and 44-50 were rejected as being obvious over U.S. Patent No. 6,438,147 to Roychoudhuri in view of European Patent No. 910184 to Kawasaki and/or U.S. Patent No. 5,754,571 to Endoh. As discussed, claim 51 is clearly distinguished over the referenced art.

It is asserted that Roychoudhuri teaches a method of controlling a laser module using temperature control means to control the laser temperature and controlling a laser current to achieve a desired wavelength of operation. It is acknowledged that control of laser temperature and laser current is well known. It is further asserted that Kawasaki and/or

Endoh teach controlling the laser output power using a variable optical attenuator. Again, it is accepted that it is known to use a variable optical attenuator to control the output of a laser module.

It is submitted that none of the cited art concerns the control of a laser during powering up. It is further submitted that were the references combined in the way suggested by the Examiner, this would not result in a disclosure of the invention since the cited art neither teaches nor directs the reader to i) setting the attenuation of a variable optical attenuator to a maximum attenuation prior to applying the laser current, ii) applying the laser current having a value which is known to produce a nominal desired wavelength and then controlling the current to achieve the desired wavelength, and iii) finally reducing the attenuation of the attenuator to achieve a desired output power.

On page 4 of the Office Action, the Examiner commented that the above limitations are "inherent because all lasers have predetermined operating conditions" which must be met in order for the lasers to operate. Applicant acknowledges that a laser has operating conditions, but that does not suggest that applicants' claimed setting, applying and reducing steps are performed, let alone "in the order specified".

To repeat, no reference either alone or in combination teaches or suggests that the first step is to establish a laser temperature "before" a laser current is applied, and to set an attenuation to a "maximum" setting, followed by the second step of applying the laser current to produce a "nominal wavelength", and further followed by the third step of "reducing the attenuation" from its maximum value.

Allowance of claims 51-65 is solicited.

Petition is hereby made for a three-month extension of the period to respond to the outstanding Official Action to January 29, 2004. A check in the amount of \$950.00, as the Petition fee, is enclosed herewith. If there are any additional charges, or any overpayment, in connection with the filing of the amendment, the Commissioner is hereby authorized to charge any such deficiency, or credit any such overpayment, to Deposit Account No. 11-1145.

Wherefore, a favorable action is earnestly solicited.

Respectfully submitted,

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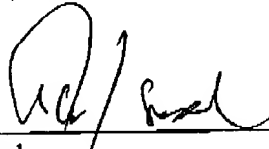
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